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ARIZONA CORPORATION COMMISSION

KRISTIN K. MAYES
Chairman

Direct Line: (602) 542-4143
Fax: (602) 542-0765
E-mail: kmayes@azcc.gov

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Commissioner Gary Pierce
Commissioner Paul Newman
Commissioner Sandra Kennedy
Commissioner Bob Stump

Re: Dry cooling and hybridized dry cooling technology use by concentrated solar projects in Arizona.

Dear Colleagues:

As the Commission has moved forward with reviewing, siting and approving renewable power plants, issues have arisen regarding the water impacts associated with the choice in cooling technologies for these projects. These issues are particularly relevant in Arizona in light of its arid climate, projected population growth and existing water constraints. The need to examine water use by all generation sources is also likely to be heightened by climate changes, as some are predicting a three to four degree increase in temperature in the Western United States by 2030[1] and projections of a 25 percent streamflow decline for the Colorado River between 2006 and 2030.[2] Recent history elsewhere underscores the impact of water scarcity on electric generation, as the August 2007 drought in the southeastern United States forced regional nuclear plants to reduce their output by up to 50 percent due to low river levels.[3]

The question of water conservation by renewable generation sources has received some attention already in Arizona. In a 2007 letter to the members of the Commission, Arizona Department of Water Resources Director Herb Guenther, outlined the intersection between power plants and active management areas ("AMA"). In his letter, Director Guenther noted that the main conservation practice required of generation plants in AMAs is the achievement of an annual average of 15 or more cycles of concentration of cooling tower water and facilities could make use of other conservation technologies which resulted in greater conservation. While cycling of water certainly provides conservation benefits it is clear that other technologies currently exist which could further conservation efforts.

Additionally, among the issues considered in APS' proposed Resource Plan is the degree to which water consumption is a factor in electricity generation. A key assumption within the APS proposed Resource Plan is that future resources would move away from wet-cooled technologies and incorporate dry-cooling or hybrid-cooling.[4] Given this recognition of future changes in power plant cooling, the key question remaining is how quickly such changes should be pursued and adopted.

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[1] See "U.S. Global Change Research Program, Climate Change Impacts on the United States, The Potential Consequences of Cllimate Variabililty and Change, Chapter 8 – Potential consequences of Climate Variability and Change for the Western United States", Joe B. Smith, Richard Richels, and Barbara Miller.
[2] See "Past Peak Water", Martin Hoerling, NOAA Earth System Research Laboratory and Jon Eischeid, University of Colorado – CIRES.
[3] See Testimony of Dr. Kristina M. Johnson, Under Secretary of Energy, U.S. Department of Energy before the Committee on Science and Technology, Subcommittee on Energy and Environment, U.S. House of Representatives, July 9, 2009.
[4] See APS Resource Plan, Drivers and Key Assumptions, Brad Albert, March 7, 2008.

A recent Department of Energy study of concentrating solar plant water consumption found that a dry-cooled parabolic trough plant in Mojave, California would produce five percent less electric energy annually and increase costs seven to nine percent compared to wet cooling.[5] While these numbers look relatively modest, the study further noted that performance degradation increased to nearly 15 percent at an ambient temperature of 110 degrees.[6]

While exclusive use of dry-cooled technologies may not make sense in every circumstance for both cost and performance reasons, I believe hybrid technologies may offer some promise. As I understand it, certain hybrid technologies operate in parallel, primarily relying on dry-cooling but also employing limited wet cooling for higher temperature days. Additionally, these systems may prove less expensive than air-cooled plants.

Going forward it is critical that the Commission indicate how this issue will be developed and addressed within our line-siting process and otherwise. My office, and undoubtedly every Commissioner's office, has received numerous letters from individuals, local officials and other interested parties on this issue. Accordingly, it is important that the Commission provide some guidance to Commission Staff, other elected bodies and the public on generation water use and the adoption of water saving cooling technologies.

Therefore, I write today to propose that the Commission issue a Notice of Inquiry asking for comment on cooling technologies and issues or concerns related to their adoption. At a future date, perhaps in the first or second quarter of 2010, the Commission could take further steps, perhaps by adopting a policy statement outlining a moratorium date for future generation projects using wet cooling technologies, or other policy steps designed to encourage the most appropriate use of water by new concentrated solar technologies.

I look forward to addressing this topic at a future staff meeting.

Sincerely,

Kris Mayes
Chairman

Cc: Ernest Johnson
Steve Olea
Janice Alward
Rebecca Wilder
John Foreman
Herb Guenther
Ben Grumbles

[5] See "Concentrating Solar Power Commercial Application Study: Reducing Water Consumption of Concentrating Solar Power Electricity Generation", Report to Congress, Department of Energy.
[6] Id at 14.